

COMPUTERFACTS™

Technical Service Data

OKIDATA® MODEL MICROLINE 192 PLUS PRINTER



FEATURES COMPLETE SCHEMATICS • PRELIMINARY SERVICE CHECKS • TROUBLESHOOTING TIPS •
EASY-READ WAVEFORMS • REPLACEMENT PARTS LISTS • SEMICONDUCTOR CROSS-REFERENCE

PRELIMINARY SERVICE CHECKS

This data provides the user with a time-saving service tool which is designed for quick isolation and repair of Computer system malfunctions.

Check all interconnecting cables for good connection and correct hook-up before making service checks.

Always turn Printer Off before connecting or disconnecting connectors, boards or Computer.

Replacement or repair of the Power Supply, Driver Board, Interface Board or connectors may be necessary after the malfunction has been isolated.

TEST EQUIPMENT

Digital Volt/Ohm Meter

TOOLS

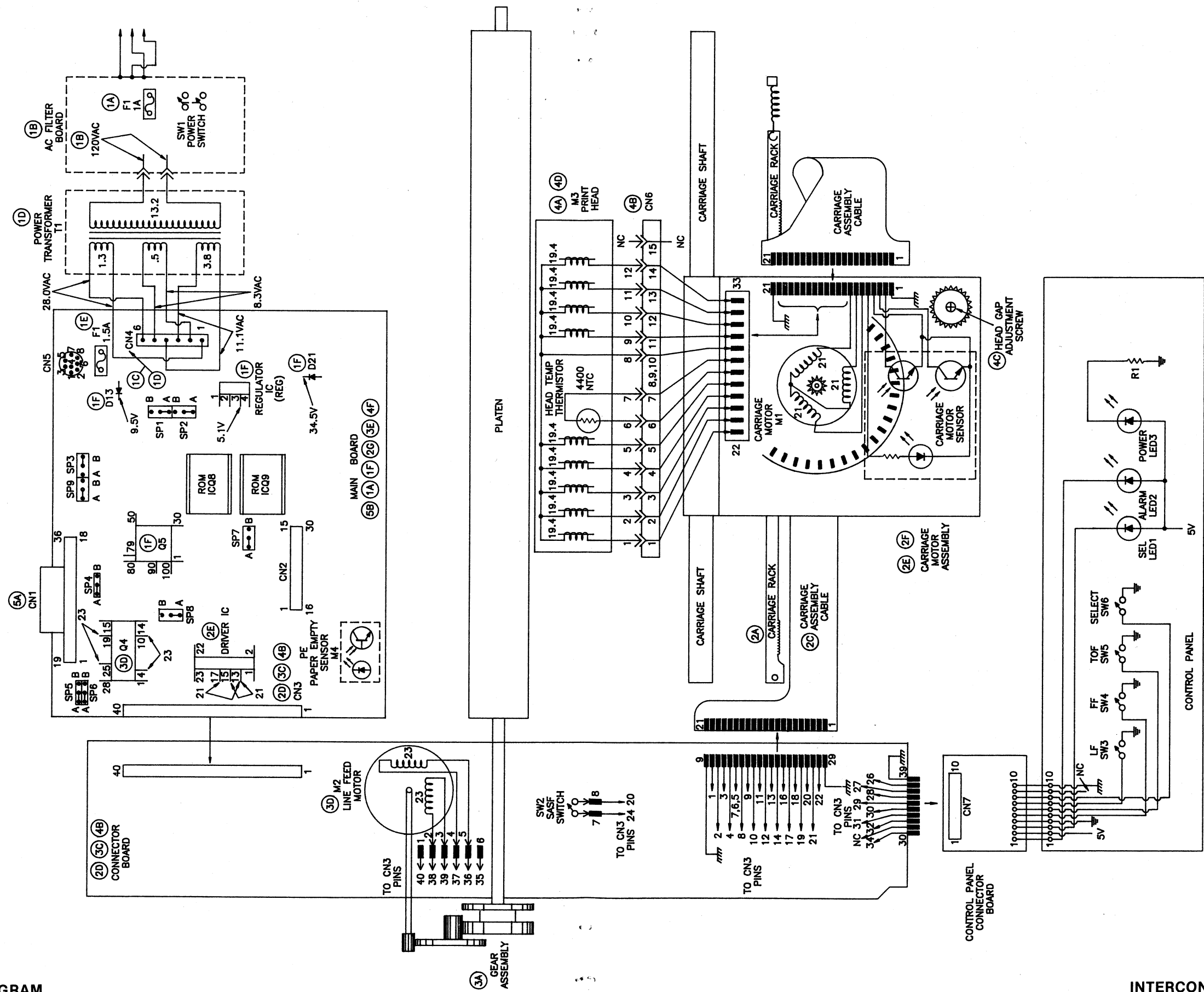
Head Cleaning Equipment (Ethyl Alcohol)
Contact and Switch Cleaner (non-spray type)
Phillips Screwdriver
Flat-Blade Screwdriver
IC Insertion and Removal Tools 28 pin
Low Wattage Soldering Iron
Desoldering Equipment

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PRELIMINARY SERVICE CHECKS (Continued)



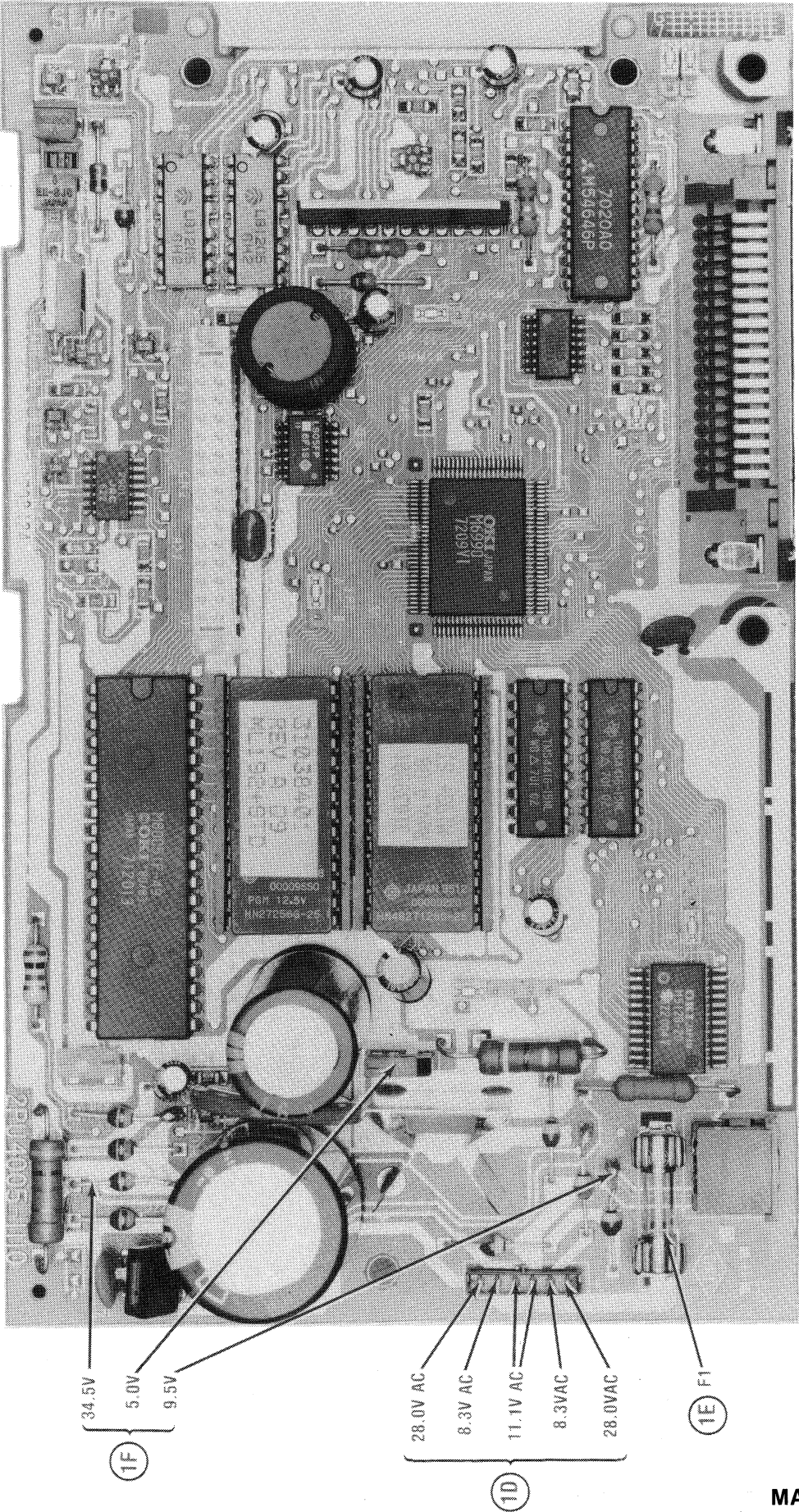
INTERCONNECTING DIAGRAM

INTERCONNECTING DIAGRAM

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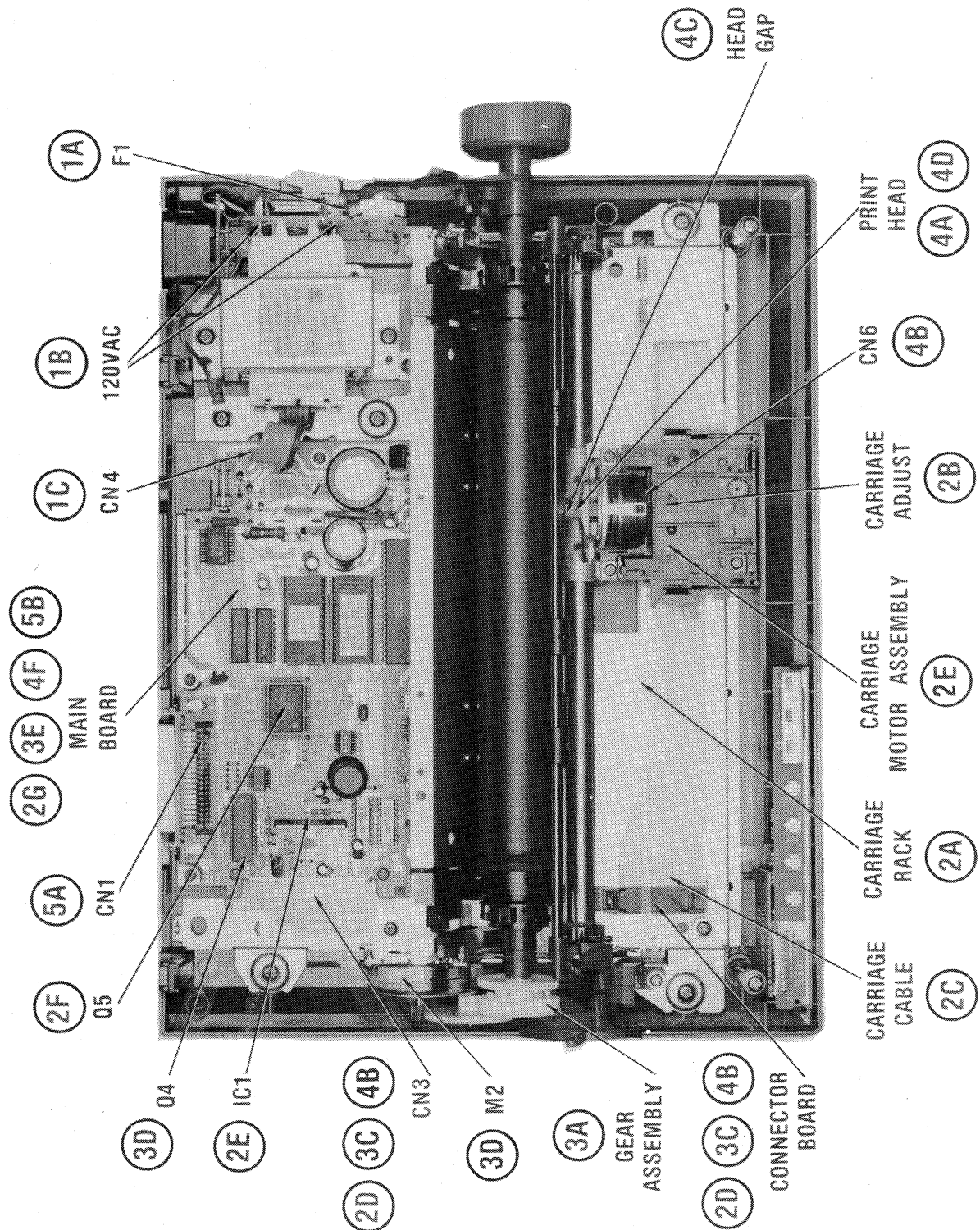
PRELIMINARY SERVICE CHECKS (Continued)

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MAIN BOARD

PRELIMINARY SERVICE CHECKS (Continued)



CHASSIS - OVERALL VIEW

PRELIMINARY SERVICE CHECKS (Continued)

SERVICE CHECKS

MATCH THE NUMBERS ON THE INTERCONNECTING DIAGRAM AND PHOTOS WITH THE NUMBERS ON THE SERVICE CHECKS TO BE PERFORMED.

① PRINTER DEAD

- (A) Check AC Fuse (F1).
- (B) Check for 120VAC across Power Transformer primary winding. If voltage is missing, check AC Filter Board by substitution.
- (C) Check Connector CN4 for good connection.
- (D) Check for 8.3VAC between pins 2 and 5, 28.0VAC between pins 1 and 6 and 11.1VAC between pins 3 and 4 of Connector CN4. If any voltage is missing, check Power Transformer by substitution.
- (E) Check Main Board Fuse (F1).
- (F) Check for 9.5V at cathode of Diode D13, 5.0V at pin 3 of Regulator IC (IC2) and 34.5V at cathode of Diode D21. If any voltage is missing, check Main Board by substitution.

② PRINTER CARRIAGE ASSEMBLY FAILS TO MOVE OR MOVES ERRATICALLY

- (A) Inspect Carriage Rack for damage.
- (B) Check Carriage Rack/Roller Adjustment.
- (C) Check Carriage Cable.
- (D) Check Connector Board and Connector CN3.
- (E) Check for 21 ohms between pins 13 and 16, 17 and 18 of Connector CN3. If resistance is not correct, check Carriage Motor Assembly by substitution.

- (F) Manually move Carriage Assembly and check for pulses on pins 79 and 80 of Controller IC (Q5). If pulses are missing, check Carriage Motor Assembly by substitution.

- (G) Check Main Board by substitution.

③ LINE FEED MOTOR MALFUNCTIONING

- (A) Check Gear Assembly.
- (C) Check Connector Board and Connector CN3.
- (D) Check for 23 ohms between pins 38 and 39 and 36 and 37 of Connector CN3. If resistance is not correct, check Line Feed Motor (M2) by substitution.
- (E) Check Main Board by substitution.

④ PRINT HEAD MALFUNCTIONING

- (A) Check Print Head face for damage or contamination.
- (B) Check Print Head Connector (CN6), Connector Board and Connector CN3.
- (C) Check Head Gap Adjustment.
- (D) Remove Print Head from Printer and check Print Head resistance, if resistance is not correct, replace Print Head.

⑤ PRINTER WILL NOT RECEIVE DATA

- (A) Check Connector CN1 and Interface Cable.
- (B) Check Main Board by substitution.

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PRELIMINARY SERVICE CHECKS (Continued)

DISASSEMBLY INSTRUCTIONS

UPPER COVER

Remove Access Cover and Platen knob. Remove two screws from front of Upper Cover. Lift front of Upper Cover and slide it back, to remove.

CONTROL PANEL BOARD

Remove Upper Cover. Release two tabs holding Control Panel Board to Bottom Cover. Disconnect Control Panel Connector from Connector Board and remove Control Panel Board.

CONTROL BOARD

Remove Upper Cover. Remove screw securing Power Transformer ground wire. Disconnect Connector CN4. Remove five screws securing Control Board and remove Control Board from Printer.

POWER TRANSFORMER

Remove Upper Cover. Disconnect Connector CN4 from Control Board. Remove screw securing Power Transformer ground wire and two screws holding Power Transformer to Bottom Cover. Remove AC Power Cord Connector from slot in Bottom Cover and remove Power Transformer from Printer.

POWER SUPPLY BOARD

Remove Upper Cover and Power Transformer. Pull the Power Supply Board off the Power Transformer pins.

PRINT HEAD

Remove Access Cover and Ribbon Cartridge. Lift Print Head clamp, located right side of Print Head. Pull Print Head straight up and out of Printer.

RIBBON FEED GEAR ASSEMBLY

Remove Upper Cover and Ribbon Cartridge.

Release four tabs securing Ribbon Feed Gear Assembly to Carriage Motor Assembly. Lift Ribbon Feed Gear Assembly high enough to remove Carriage Cable. Remove Ribbon Feed Gear Assembly from Printer.

CARRIAGE MOTOR ASSEMBLY

Remove Upper Cover, Print Head and Ribbon Feed Gear Assembly. Remove Print Head Connector. Remove three screws securing Carriage Motor Assembly from Printer.

CARRIAGE RACK

Remove Upper Cover, Print Head, Ribbon Feed Gear Assembly and Carriage Motor Assembly. Remove spring from right end of Carriage Rack. Carefully pry left end of Carriage Rack off Printer Mechanism tab. Remove Carriage Rack.

CARRIAGE CABLE

Remove Upper Cover, Print Head, Ribbon Feed Gear Assembly, Carriage Motor Assembly and Carriage Rack. Release two tabs from Connector Board Cable clamp. Remove Carriage Cable.

PRINTER MECHANISM

Remove Upper Cover, Control Board and Control Panel Board. Remove four screws securing Printer Mechanism to Bottom Cover and remove Printer Mechanism.

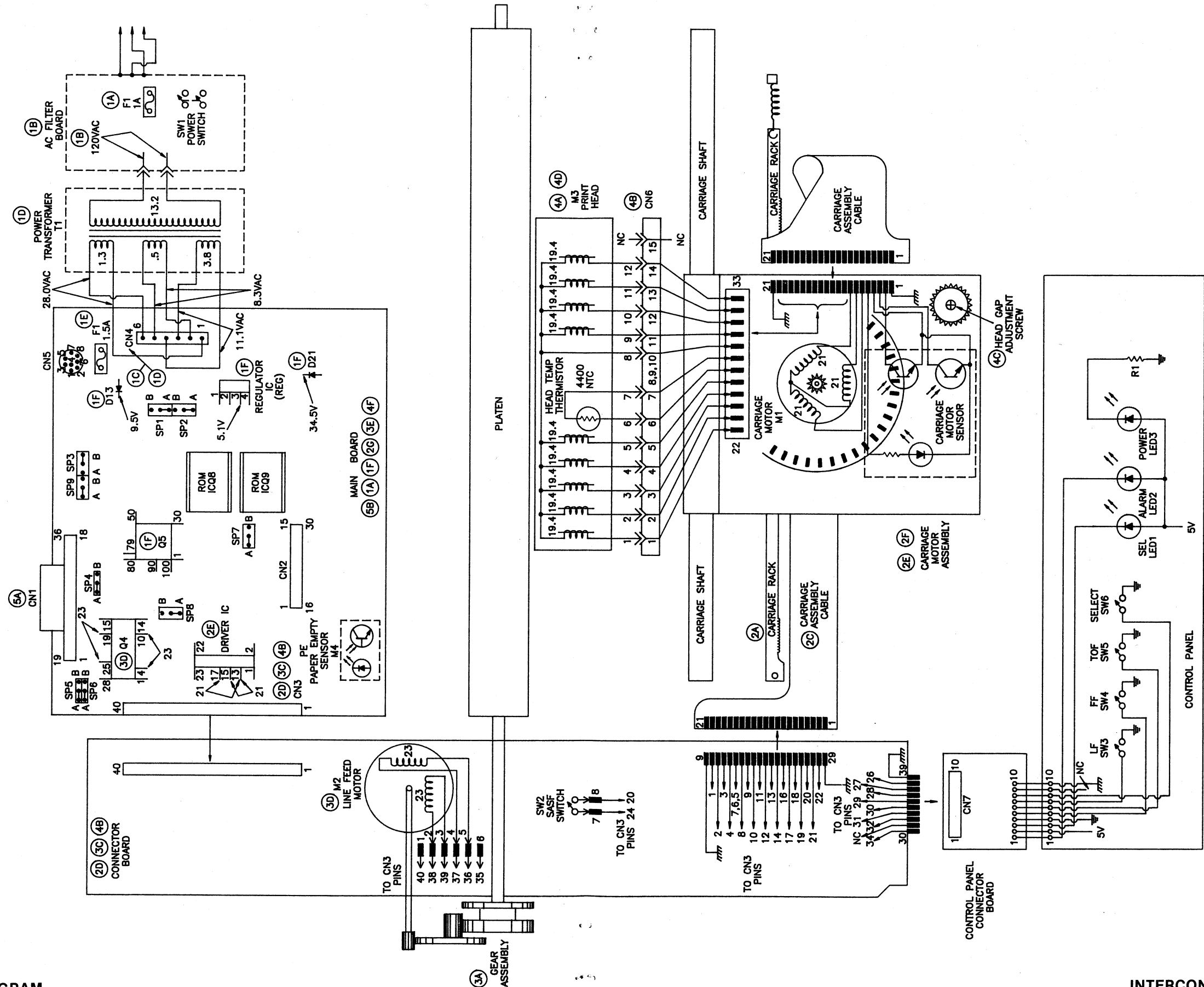
LINE FEED MOTOR

Remove Upper Cover and Printer Mechanism. Remove two screws securing Line Feed Motor to Printer Mechanism and remove Line Feed Motor.

PLATEN ASSEMBLY

Remove Upper Cover. Release four tabs, two on each end of Platen, from left and right Platen frames. Pull Platen up and out of Printer.

PRELIMINARY SERVICE CHECKS (Continued)



PRELIMINARY SERVICE CHECKS (Continued)

ENVIRONMENT

Computers perform best in a clean, cool area that is below 80 degrees Fahrenheit and free of dust and smoke particles. Even though home Computers are not affected by cigarette smoke as much as commercial Computers are affected, it is better to maintain a smoke-free area around the Computer. Do not block cabinet vents of Computer, Monitor, Printer or other power devices.

ELECTRICAL POWER

Variations in the line voltage can affect the Computer. Try to avoid these fluctuations by using an AC receptacle that is on a power line not used by appliances or other heavy current demand devices. A power-surge protector, power-line conditioner or noninterruptible power supply may be needed to cure the problem. DO NOT switch power On and Off frequently.

KEYBOARD

Liquids spilled into the Keyboard can ruin it. Immediately after a spill occurs, disconnect the Computer power plug from AC power outlet. Then, if circuitry or contacts are contaminated, disassemble the Keyboard and carefully rinse the Keyboard printed circuit board with distilled water and let it dry. Use a cotton swab between the keys. Use a nonabrasive contact cleaner and lint-free wipers on accessible connectors and contacts.

DISK DRIVES

Clean the read/write heads of the Disk Drives about once a month or after 100 hours usage. Use only an approved head cleaning kit.

Handle carefully to preserve proper disk head alignment. A sudden bump or jolt to the Disk Drives can knock the disk head out of alignment. If Disk Drive must be transported, place an old disk in slot and close door during transport.

Store disks in their protective covers and never touch the disk surface. Observe the disk handling precautions usually found on the back of disk protective covers.

PRINTERS

Carefully vacuum the Printer regularly. Wipe surface areas clean using a light all-purpose cleaner. Do not clean the machine. The oil will collect abrasive grit and dust. The dust will act as a blanket. This can cause components to overheat and fail.

STATIC ELECTRICITY

Static electricity discharge can affect the Computer. In order to minimize the possibility, use anti-static mats, sprays, tools and materials and maintain good humidity in the Computer environment.

MONITOR

Use an isolation transformer with any Monitor that does not come as part of the system since some Monitors use a HOT chassis (chassis connected to one side of the AC line). The face of the Monitor should never be left on for long periods of time at high brightness level except when pattern is being changed periodically. Use caution when cleaning anti-glare screens to preserve the glare-reduction feature.

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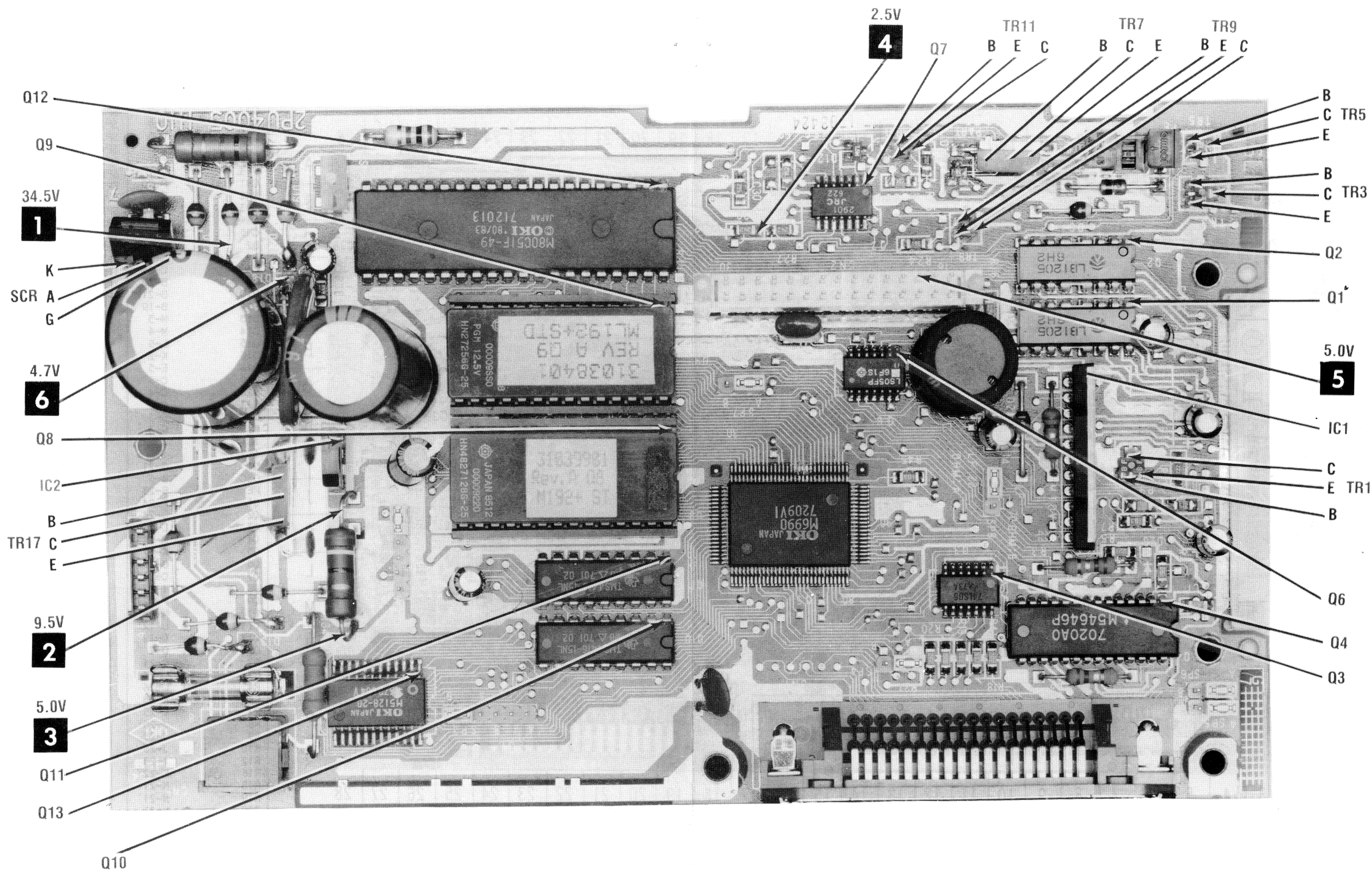
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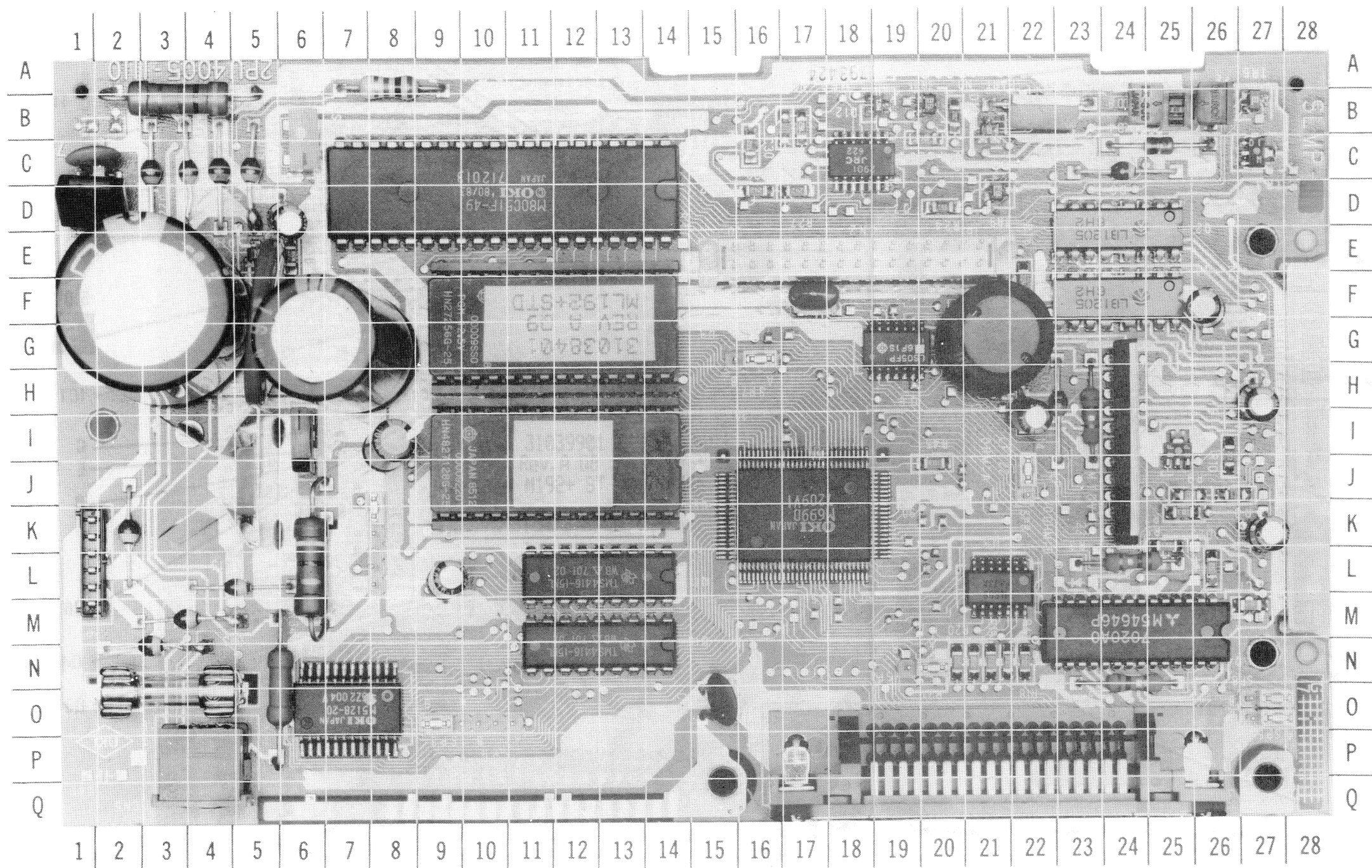
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MAIN BOARD

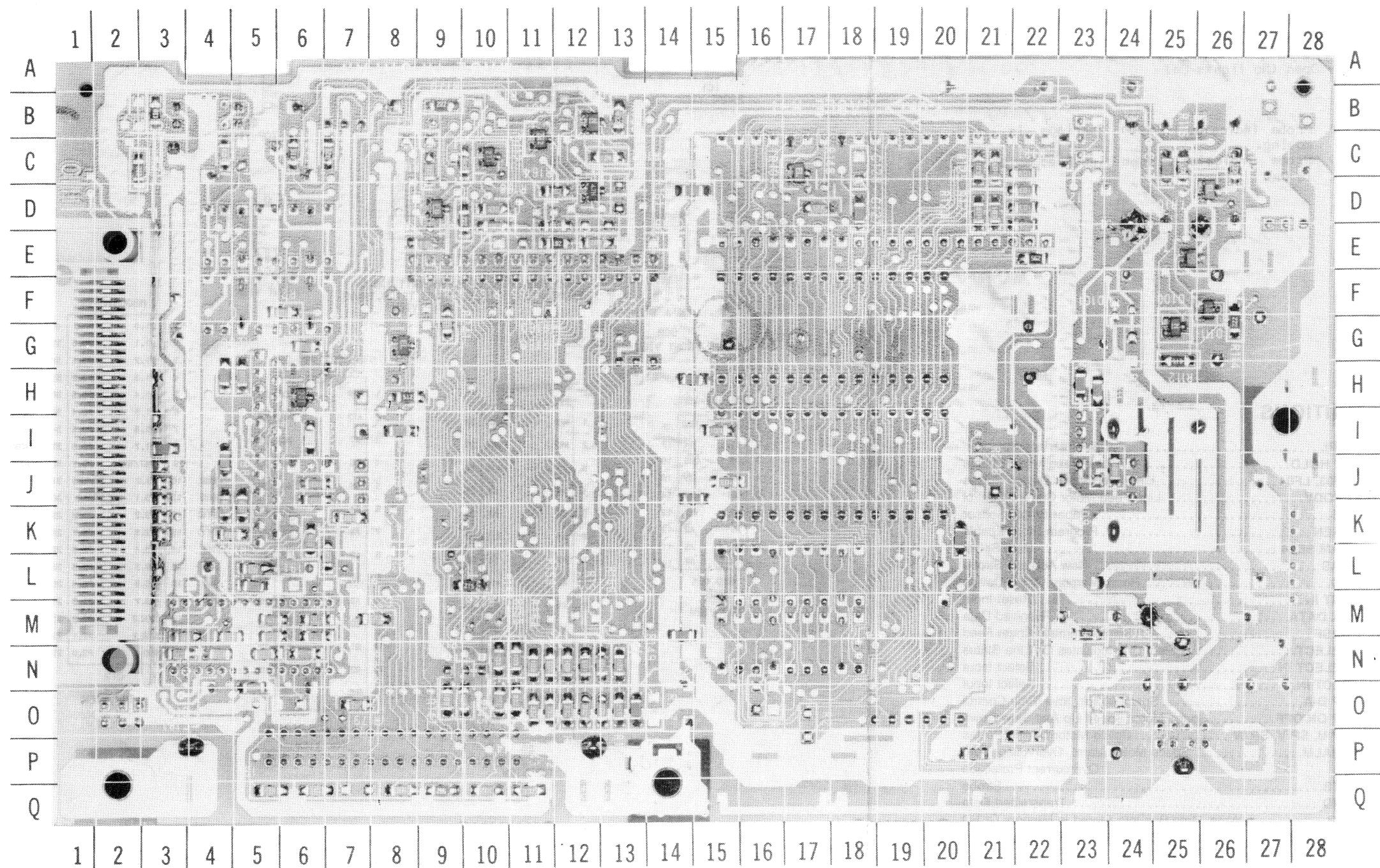
A Howard W. Sams **GRIDTRACE™** Photo

GridTrace LOCATION GUIDE

BAT	F-5	R33	L-6
C1	M-27	R34	N-5
C6	K-27	R38	E-6
C11	H-27	R40	A-8
C13	O-15	R44	B-3
C14	I-22	R45	J-20
C15	F-26	R47	N-22
C23	F-17	SCR	P-1
C32	L-9	SP1	L-8
C35	I-8	SP2	K-8
C36	G-6	SP3	O-9
C39	D-6	SP4	N-20
C42	F-2	SP5	O-27
C43	C-1	SP6	O-27
CN1	P-20	SP7	G-16
CN2	E-19	SP8	J-22
CN3	I-28	SP9	O-10
CN4	L-1	TR1	I-25
CN5	P-4	TR3	C-27
D2	H-23	TR5	B-27
D4	C-25	TR7	B-22
D6	C-24	TR9	D-21
D8	B-22	TR11	B-20
D10	B-21	TR17	J-5
D12	B-19		
D13	M-3		
D14	M-4		
D15	L-5		
D16	K-2		
D18	E-5		
D19	C-5		
D20	C-4		
D21	C-4		
D22	C-3		
F1	O-3		
IC1	I-24		
IC2	I-6		
L1	G-21		
OSC	B-6		
PE	B-25		
Q1	F-24		
Q2	D-24		
Q3	L-21		
Q4	M-24		
Q5	K-17		
Q6	G-19		
Q7	C-18		
Q8	I-12		
Q9	F-12		
Q10	M-12		
Q11	L-12		
Q12	C-12		
Q13	O-7		
R2	O-24		
R3	L-24		
R4	L-26		
R5	K-25		
R7	K-25		
R8	J-26		
R9	J-25		
R10	J-26		
R12	I-23		
R16	F-22		
R18	N-21		
R19	N-21		
R20	N-21		
R21	N-20		
R24	D-20		
R25	B-20		
R26	C-20		
R27	D-17		
R28	D-16		
R29	B-17		
R31	C-16		

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MAIN BOARD



MAIN BOARD - BOTTOM VIEW

A Howard W. Sams GRIDTRACE™ Photo

GridTrace LOCATION GUIDE

C107	P-21	R164	D-12
C110	G-23	R166	E-9
C111	G-23	R167	D-10
C117	C-25	R168	D-10
C127	D-18	R169	C-9
C129	D-14	R170	B-9
C133	M-14	R172	Q-11
C134	J-14	R173	Q-10
C136	H-15	R174	Q-8
C181	N-5	R175	C-10
C182	N-4	R177	Q-6
C186	M-5	R178	Q-5
C188	M-4	R179	Q-7
C204	J-3	R180	N-6
C205	I-3	R183	N-3
C207	H-4	R184	M-6
C208	G-6	R185	M-6
C215	I-6	R187	M-5
C218	L-3	R189	M-3
C225	Q-13	R190	L-7
C229	L-5	R191	L-5
C230	J-4	R192	K-6
C231	M-8	R193	K-4
C234	K-20	R194	K-7
C237	I-8	R195	J-6
C238	C-23	R196	J-6
D100	G-25	R197	Q-5
D105	D-12	R198	K-5
D106	B-12	R199	K-4
D107	C-11	R200	K-3
D110	H-6	R201	K-3
D111	F-26	R202	J-3
D112	C-10	R203	J-3
R103	N-24	R206	H-5
R105	M-23	R209	F-6
R106	P-22	R210	C-7
R109	J-24	R211	C-6
R112	G-25	R212	C-4
R114	G-26	R213	C-2
R115	C-26	R214	B-3
R116	C-25	R220	E-22
R118	E-22	R223	Q-9
R119	D-22	R227	H-8
R120	D-22	R228	L-10
R121	C-22	R232	J-15
R122	D-21	R240	D-10
R123	D-21	R241	G-9
R124	C-21	TR102	E-25
R125	C-21	TR103	D-26
R135	I-15	TR104	C-17
R138	Q-13	TR108	D-9
R139	Q-13	TR109	G-8
R140	Q-12		
R141	Q-12		
R142	Q-11		
R143	Q-11		
R144	Q-11		
R145	Q-10		
R146	Q-10		
R147	Q-9		
R148	D-17		
R149	N-13		
R150	N-13		
R151	N-12		
R152	N-12		
R153	N-11		
R154	N-11		
R155	N-11		
R156	N-10		
R158	E-12		
R159	E-12		
R160	D-12		
R162	C-13		
R163	B-13		

MAIN BOARD - BOTTOM VIEW

SCHEMATIC NOTES

- ▽ Isolated ground.
- ✱ Circuitry not used in some versions
- Circuitry used in some versions
- ⊖ See Parts List
- ⊕ Ground

Voltage measured with digital meter.

Waveforms and voltages taken from ground, unless noted otherwise.

All measurements taken with Printer in Self-Test mode unless noted.

Supply voltages maintained as shown at input.

Controls adjusted for normal operation.

Terminal identification may not be found on unit.

Capacitors are 50 volts or less, 5% unless noted.

Electrolytic Capacitors are 50 volts or less, 20% unless noted.

Resistors are 1/2W or less, 5% unless noted.

Value in () used in some versions.

Measurements taken with switching; as shown, unless noted.

Logic Probe Display

L = Low

H = High

P = Pulse

* = Open (No lights On)

(1) Probe Indicates P when Carriage is moving.

(2) Probe Indicates P When Line Feed Motor is On.

LINE DEFINITIONS

A0 THRU A15 Address Bits 0 Thru 15
ACK Acknowledge, Data Has Been Received
ALE Address Latch Enable
ALM Alarm, Circuit Fault
AUTO FEED Automatic Paper Feed
BUSY Busy, Off Line, Data Entry, Paper Feed, Printing
CAS Column Address Strobe, Memory
CE Chip Enable
COVER OPEN Printer Cover Open Switch
CSF CCW Cut Sheet Feeder Motor, Counter Clockwise
CSF CONNECT Cut Sheet Feeder Motor Connect
CSF CW Cut Sheet Feeder Motor Clockwise
D0 THRU D7 Data Bits 0 Thru 7
DATA1 THRU DATA 8 Data Bits 1 Thru 8
FAULT Error State, Paper Empty, Cover Open
HD ALM Print Head Alarm, Overvoltage And Over Current Protection
HEAD 1 THRU HEAD 9 Print Head Driving Pulses 1 Thru 9
HEAD ON Print Head Enable
HEAD TEMP Print Head Motor Overheat Protection
I-PRIME Input Prime, Clears Memory, Initializes System
IPT Dot Timing Signal
IPT BUSY Input Busy
IPT PRM Input Prime, Clears Memory, Initializes System

ISEL Parallel Interface Selection
LF HOLD Line Feed Motor Enable
LF03, LF04 Line Feed Motor Driving Pulses
LFODV Line Feed Motor Current Control
PE Paper Empty Sensor
PSEN Program Store Enable
RAM SEL4 Ram Select
RAS Row Address Strobe
RD Read, Memory Or I/O Device
RST IN Reset Input
RX DATA Received Data
SASF Semi-Automatic Sheet Feed
SELECT Select Line Indicates On Line Status
SELECT IN Select Input
SLCT IN Select Input
SP D-A Space Motor Drive Time Control
SP ON/OFF Space Motor Speed Up And Slow Down
SP U, SP V, SP W Space Motor Driving Pulses
SPALM Space Motor Alarm, Overvoltage And Overcurrent Protection
STB Strobe
TXD Transmitted Data
WR Write, Data Bus Info Stored In Memory Or I/O

TEST EQUIPMENT

Test Equipment listed by Manufacturer illustrates typical or equivalent equipment used by SAMS' Engineers to obtain measurements and is compatible with most types used by field service technicians.

TEST EQUIPMENT (COMPUTERFACTS)

Equipment	B & K Precision Equipment No.	Sencore Equipment No.	Notes
OSCILLOSCOPE	1570A,1590A,1596	SC61	
LOGIC PROBE	DP51,DP21		
LOGIC PULSER	DP101,DP31		
DIGITAL VOM	2830,2806	DVM37,DVM56,SC61	
ANALOG VOM	277,111,116		
ISOLATION TRANSFORMER	TR110,1604,1653,1655	PR57	
FREQUENCY COUNTER	1803,1805	FC71,SC61	
COLOR BAR GENERATOR	1211A,1251,1260,1249	CG25,VA62	
RGB GENERATOR	1260,1249		
FUNCTION GENERATOR	3020,3011,3030		
HI-VOLTAGE PROBE VOM/DMM Accessory probes	HV-44 PR-28(HV)	HP200	
TEMPERATURE PROBE	TP-28,TP-30		
CRT ANALYZER	467,470	CR70	
DIGITAL IC TESTER	560,550,552		
CAPACITANCE ANALYZER		LC53,LC75,LC76 LC77	
INDUCTANCE ANALYZER		LC53,LC75,LC76 LC77	

TROUBLESHOOTING

POWER SUPPLY

Printer is dead. Check AC Fuse (F1). If open replace fuse and reapply power. If Fuse F1 opens again, remove Alarm SCR (SCR) and replace Fuse F1. Momentarily turn On Printer power. If Fuse F1 opens check for shorts in AC Filter Board Capacitors C1 thru C3, Power Transformer (T1), Diodes D19 thru D22 and Electrolytic C15 and C42. If Fuse F1 is not open, check for approximately 5.0V on Alarm SCR gate. If 5.0V is not present, check Alarm SCR by substitution. If 5.0V is present, the Alarm Circuit has activated, indicating a drive circuit problem. Check Alarm Circuit Transistors TR102, TR103, Diodes D10, D100, Zener Diode D111 and associated components for possible shorts. If Alarm Circuit components are good, check Driver IC's, Q1, Q2, Q4, IC1 and associated components.

If AC Filter Board Fuse is good check Main Board Fuse (F1). If open, check Diodes D13 through D16 and Electrolytic C36 for possible shorts. If Main Board Fuse is good, check for approximately 120VAC across primary windings of Transformer T1. If missing, check Coil L1 for possible open and check operation of Power Switch (SW1).

PRINT HEAD

If characters are printed, but are too light or uneven, check Head Gap Adjustment. If Print Head is properly adjusted and undamaged, remove Print Head and check for 19.4 ohms between pins 1 thru 5, pins 9 thru 12 and pin 8 of the Print Head connector. If any resistance is not correct, check Print Head by substitution. If Print Head is good, initiate Printer Self Test and check the waveform on pin 12 of Controller IC (Q5). If waveform is not correct, check Q5 by substitution.

CPU OPERATION

Check voltages, logic and waveforms associated with CPU IC (Q12). If waveforms on pins 18 and 19 of Q12 are not correct, check Oscillator (OSC) by substitution. If logic is not correct on pin 9, check for 4.6V on pin 10 and 2V on pin 11 of IC Q7. If voltages on pins 10 and 11 of Q7 are correct, check Q7 and components associated with pin 13 of Q7. If voltage on pin 10 of Q7 is not correct, check Resistor R160 and Zener Diode D105. If voltage is not correct on pin 11 of Q7, check Q3 and components associated with pins 12 and 13 of Q3.

TROUBLESHOOTING (Continued)

LINE FEED MOTOR

Check for 23 ohms between pins 38 and 39, and pins 36 and 37 of Connector CN3. If resistance is not correct, check Line Feed Motor by substitution. If Line Feed Motor is good, check Connector Board and Connector CN3. Check waveforms on pins 4, 10, 19, 25 of Driver IC (Q4). If waveforms are not correct, check the waveforms on pins 14 and 15 of Q4. If waveforms are not correct, check Controller IC (Q5) and associated components.

If the waveforms on pins 14 and 15 of IC Q4 are correct, check waveform on pin 2 of IC Q4. If waveform is not correct, press Form Feed button and check for pulses on pins 12 and 13 of IC Q6. If pulses are missing on pin 13, check Resistor R228 and IC Q5. If pulses are present on pin 13 and missing on pin 12, check Resistor R227 and IC Q6. If pulses are present on pins 12 and 13 of IC Q6, check Transistors TR104, TR109 and associated components.

CARRIAGE MOTOR

Check for 21 ohms between pins 16 and 17 and pins 17 and 18 of Connector CN3. If resistance is not correct, check Carriage Motor Assembly by substitution. If Carriage Motor Assembly is good, check Connector Board, Connector CN3 and Carriage Cable. If resistance is correct, check for a logic Low on pin 54 of Controller IC (Q5). If logic is High, the Head Temperature Circuit has activated, check for approximately 4.0V on pin 4 of IC Q7. If voltage is less than 2.5V and Print Head is cool, check Print Head by substitution. If voltage is correct on pin 4 of IC Q7, check IC Q7 and associated

components. If logic on pin 54 of IC Q5 is correct, manually move Carriage Assembly and check waveforms on pins 79 and 80 of IC Q5. If waveforms are not correct, check Capacitors C204 and C205 and check Carriage Motor Assembly by substitution. If waveforms are correct on pins 79 and 80 of IC Q5, initiate Printer Self-Test, check waveforms on pins 6, 19, 21, 23 of Driver (IC1).

If waveforms are not correct, check Controller IC (Q5) by substitution. If IC Q5 is good, check CPU IC (Q12) by substitution. If waveforms on pins 6, 19, 21, 23 of IC1 are correct, check waveform on pin 89 of IC5. If waveform is not correct, check components associated with pin 89 of IC5. If components are good, check IC Q5 by substitution. If waveform on pin 89 of IC5 is correct, check waveforms on pins 13, 15 and 17 of IC1. If waveforms are present, check Carriage Motor Assembly by substitution. If waveforms are missing, check IC1 and associated components.

PRINTER DOES NOT RECEIVE DATA

Printer successfully performs Printer Self Test, but does not receive data from host computer. Program host computer to send data to Printer, check Controller IC (Q5) and CPU IC (Q12).

SENSOR OPERATION

Turn On Printer without paper installed and check for a logic Low on pin 55 of Controller IC (Q5). Install paper in Printer and check for a logic High on pin 55 of IC Q5. If logic is not correct on pin 55 of IC Q5, check Paper Empty Sensor and associated components.

SELF TEST

The Printer Self Test is initiated by turning On Printer Power while pressing Line Feed button. Printer will continuously print the character set. The Self Test can be stopped by pressing the select button.

MISCELLANEOUS ADJUSTMENTS

HEAD GAP ADJUSTMENT

Set Adjustment Lever to Range 1, see Figure 1. Set Paper Lock/Release Lever to lock position. Measure for 0.019 inches $\pm$ 0.003 between Print Head and Platen. If measurement is not correct, depress gear On Adjustment Screw and adjust Screw until gap between Platen and Print Head is correct.

CARRIAGE RACK/ROLLER ADJUSTMENT

Measure for 0.004 inches $\pm$ 0.002 between Roller and Carriage Rack, see Figure 2. If measurement is not correct, loosen Carriage Motor mounting screws, see Figure 3, and reposition Carriage Motor Assembly until measurement is correct. After the adjustment, attach a tension gauge to right side of Ribbon Feed Gear Assembly and ensure Carriage travel load (without Ribbon Cartridge) is less than 0.33 lbs, see Figure 3.

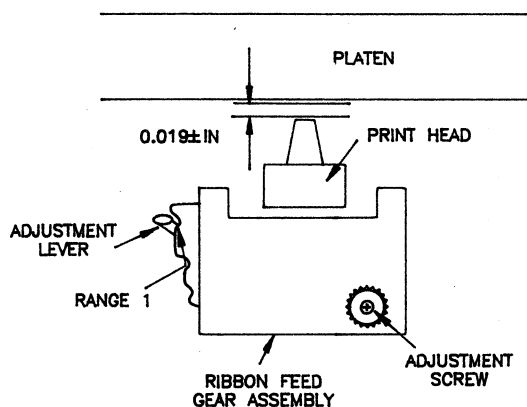


FIGURE 1

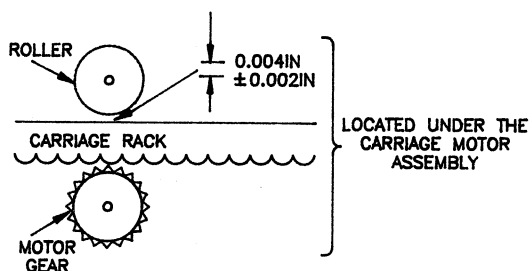


FIGURE 2

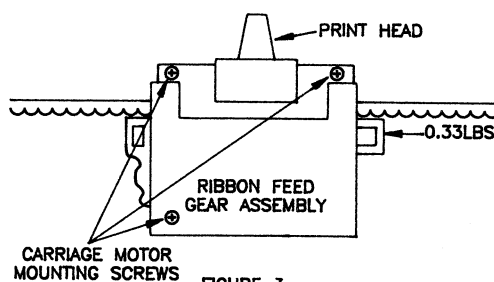


FIGURE 3

DISASSEMBLY INSTRUCTIONS

UPPER COVER

Remove Access Cover and Platen knob. Remove two screws from front of Upper Cover. Lift front of Upper Cover and slide it back, to remove.

CONTROL PANEL BOARD

Remove Upper Cover. Release two tabs holding Control Panel Board to Bottom Cover. Disconnect Control Panel Connector from Connector Board and remove Control Panel Board.

CONTROL BOARD

Remove Upper Cover. Remove screw securing Power Transformer ground wire. Disconnect Connector CN4. Remove five screws securing Control Board and remove Control Board from Printer.

POWER TRANSFORMER

Remove Upper Cover. Disconnect Connector CN4 from Control Board. Remove screw securing Power Transformer ground wire and two screws holding Power Transformer to Bottom Cover. Remove AC Power Cord Connector from slot in Bottom Cover and remove Power Transformer from Printer.

POWER SUPPLY BOARD

Remove Upper Cover and Power Transformer. Pull the Power Supply Board off the Power Transformer pins.

PRINT HEAD

Remove Access Cover and Ribbon Cartridge. Lift Print Head clamp, located right side of Print Head. Pull Print Head straight up and out of Printer.

RIBBON FEED GEAR ASSEMBLY

Remove Upper Cover and Ribbon Cartridge.

Release four tabs securing Ribbon Feed Gear Assembly to Carriage Motor Assembly. Lift Ribbon Feed Gear Assembly high enough to remove Carriage Cable. Remove Ribbon Feed Gear Assembly from Printer.

CARRIAGE MOTOR ASSEMBLY

Remove Upper Cover, Print Head and Ribbon Feed Gear Assembly. Remove Print Head Connector. Remove three screws securing Carriage Motor Assembly from Printer.

CARRIAGE RACK

Remove Upper Cover, Print Head, Ribbon Feed Gear Assembly and Carriage Motor Assembly. Remove spring from right end of Carriage Rack. Carefully pry left end of Carriage Rack off Printer Mechanism tab. Remove Carriage Rack.

CARRIAGE CABLE

Remove Upper Cover, Print Head, Ribbon Feed Gear Assembly, Carriage Motor Assembly and Carriage Rack. Release two tabs from Connector Board Cable clamp. Remove Carriage Cable.

PRINTER MECHANISM

Remove Upper Cover, Control Board and Control Panel Board. Remove four screws securing Printer Mechanism to Bottom Cover and remove Printer Mechanism.

LINE FEED MOTOR

Remove Upper Cover and Printer Mechanism. Remove two screws securing Line Feed Motor to Printer Mechanism and remove Line Feed Motor.

PLATEN ASSEMBLY

Remove Upper Cover. Release four tabs, two on each end of Platen, from left and right Platen frames. Pull Platen up and out of Printer.

PARTS LIST AND DESCRIPTION

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.	NTE PART No.	ECG PART No.	RCA PART No.	ZENITH PART No.	NOTES
MAIN BOARD						
D2	10B2(ZENER)					
D4						
D6						
D8						
D10						
D12						
D13 THRU D16						
D18						
D19 THRU D22						
D100						
D105						
D106						
D107						
D110						
D111						
D112						
IC1	HA13412					
IC2	LA5005					
Q1,2	LB1205					
Q3	74LS06(MIN)					
Q4	M54646P					
Q5	M69907209V1					
Q6	LS05FP					
Q7	2901					
Q8	HN4827128G-25					
Q9	HN27256G-25					
Q10,11	TNS4416-15NL					
Q12	M80C51F-49				HE-443-1165	

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFR. PART No./ TYPE No.					NOTES
		NTE PART No.	ECG PART No.	RCA PART No.	ZENITH PART No.	
Q13 SCR TR1 TR3	M5128-20 CR3CM8					
TR5 TR7 TR9 TR11	B882 (JAPAN)	NTE264	ECG264	SK3181A/264	121-Z9087	
TR17 TR102 TR103,4 TR108 TR109	B858 (JAPAN)	NTE55	ECG55	SK9367/55		

WIRING DATA

General-use Unshielded Hook-up Wire Use BELDEN No. 8529 (Solid) Available in 13 Colors
8522 (Stranded) Available in 13 Colors

Low-loss Shielded Lead (Interconnections). Use BELDEN No. 8401 or 8421

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

CAPACITORS Items Not Listed Are Normally Available At Local Distributors.

ITEM No.	RATING	MFGR. PART No.
C23	MAIN (OPERATION) BOARD .022 50V 2%	
C1	POWER SUPPLY MAIN BOARD .0047 125VAC	

ITEM No.	RATING	MFGR. PART No.
C2 C3	.0047 125VAC .1 250VAC 20%	

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		
		MFGR. PART No.	NTE PART No.	
TH1	MAIN (OPERATIONS) BOARD 4400 Cold NTC			

COILS & TRANSFORMERS

ITEM No.	FUNCTION	MFGR. PART No.	OTHER IDENTIFICATION	NOTES
L1 T1	Line Filter Power Transformer		3LP-45474-1 (1)	(1) Number on unit.

FUSE DEVICES

ITEM NO.	DESCRIPTION	MFGR. PART NO.		NOTES
		DEVICE	HOLDER	
F1	MAIN POWER SUPPLY 1 Amp @ 250VAC			

MISCELLANEOUS

ITEM No.	PART NAME	MFGR. PART No.	NOTES
LED 1 LED 2 LED 3 M1 M2 M3 M4 OSC SW1 SW2 SW3 SW4 SW5 SW6	LED LED LED Motor Motor Print Head Sensor Crystal Switch Switch Switch Switch Switch Switch		Select, Grn Alarm, Red Power, Grn Carriage Line Feed Paper Empty 12MHz Power SASF Line Feed Form Feed Top of Form Select

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MODEL MICROLINE 192 PLUS

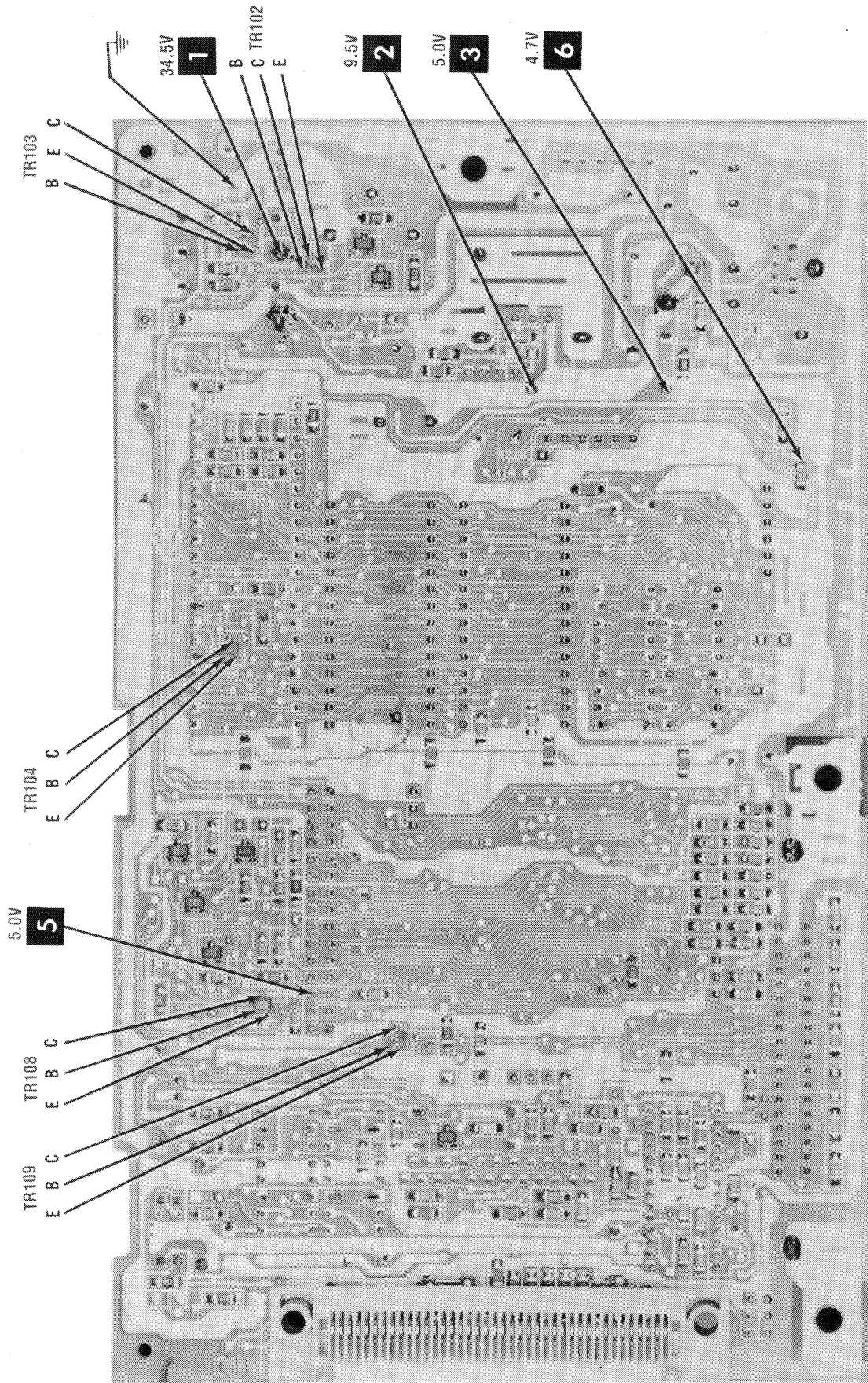
LOGIC CHART

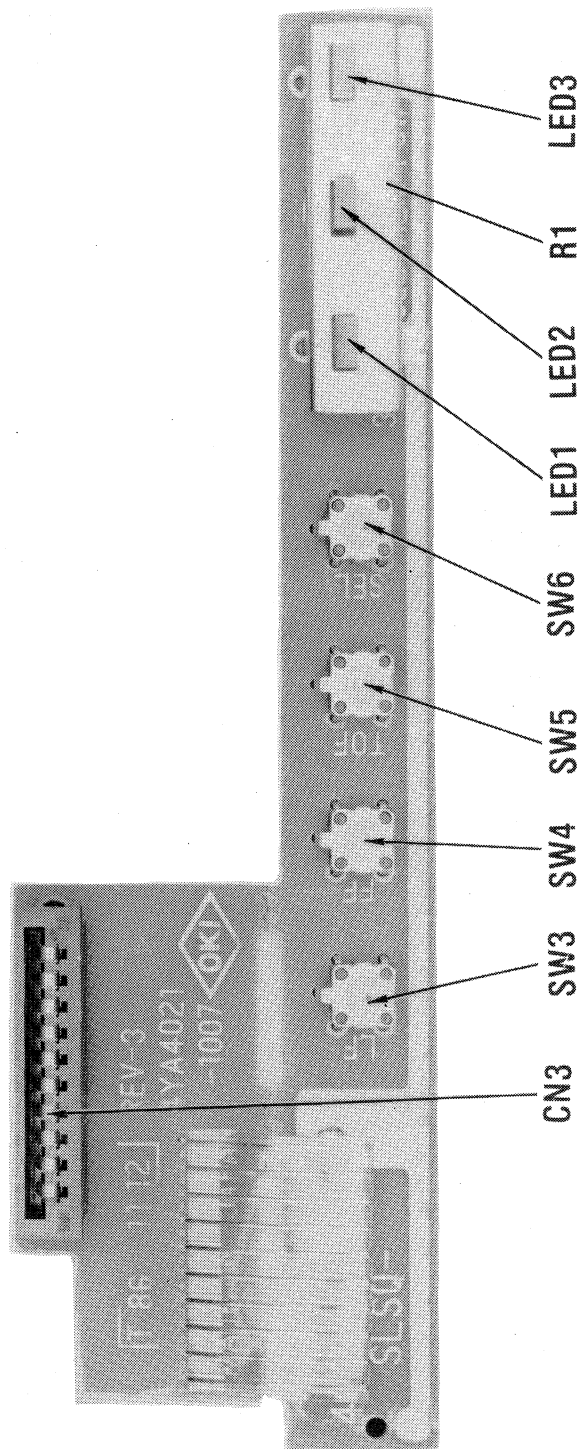
PIN NO.	IC Q3	IC Q5	PIN NO.	IC Q5	PIN NO.	IC Q5	PIN NO.	IC Q5	PIN NO.	IC Q5	PIN NO.	IC Q6
1	L	H	21	P	41	P	61	P	81	H	1	*
2	H	H	22	P	42	P	62	P	82	P	2	L
3	L	P	23	P	43	P	63	P	83	L	3	*
4	H	P	24	P	44	P	64	P	84	P	4	L
5	L	P	25	P	45	P	65	P	85	H	5	*
6	H	P	26	P	46	P	66	L	86	H	6	L
7	L	P	27	P	47	P	67	L	87	L	7	L
8	H	P	28	P	48	P	68	L	88	L	8	L
9	L	P	29	P	49	H	69	L	89	P	9	*
10	H	P	30	H	50	H	70	L	90	H	10	P
11	L	P	31	H	51	H	71	H	91	H	11	P
12	L	H(1)	32	P	52	H	72	H	92	H	12	H(2)
13	H	P	33	P	53	L	73	L(2)	93	H	13	L(2)
14	H	P	34	P	54	L	74	H(2)	94	H	14	H
15		P	35	P	55	H	75	H(2)	95	H	15	
16		L	36	P	56	H	76	L(2)	96	H	16	
17		P	37	P	57	H	77	L(2)	97	H	17	
18		H	38	P	58	H	78	L	98	H	18	
19		P	39	P	59	L	79	P	99	H	19	
20		H	40	H	60	P	80	P	100	H	20	

PIN NO.	IC Q8	PIN NO.	IC Q8	PIN NO.	IC Q9	PIN NO.	IC Q7	PIN NO.	IC Q10	IC Q11	IC Q12	PIN NO.	IC Q12
1	H	21	P	1	H	21	P	1	P	P	P	21	P
2	P	22	P	2	P	22	P	2	P	P	P	22	P
3	P	23	P	3	P	23	P	3	P	P	P	23	P
4	P	24	P	4	P	24	P	4	P	P	P	24	P
5	P	25	P	5	P	25	P	5	P	P	P	25	P
6	P	26	P	6	P	26	P	6	P	P	P	26	P
7	P	27	P	7	P	27	P	7	P	P	P	27	P
8	P	28	H	8	P	28	H	8	P	P	H	28	P
9	P			9	P			9	H	H	L	29	P
10	P			10	P			10	P	P	L	30	P
11	P			11	P			11	P	P	H	31	H
12	P			12	P			12	P	P	H(1)	32	P
13	P			13	P			13	P	P	L	33	P
14	L			14	L			14	P	P	P	34	P
15	P			15	P			15	P	P	P	35	P
16	P			16	P			16	P	P	P	36	P
17	P			17	P			17	P	P	P	37	P
18	P			18	P			18	L	L	P	38	P
19	P			19	P			19			P	39	P
20	P			20	P			20			L	40	H

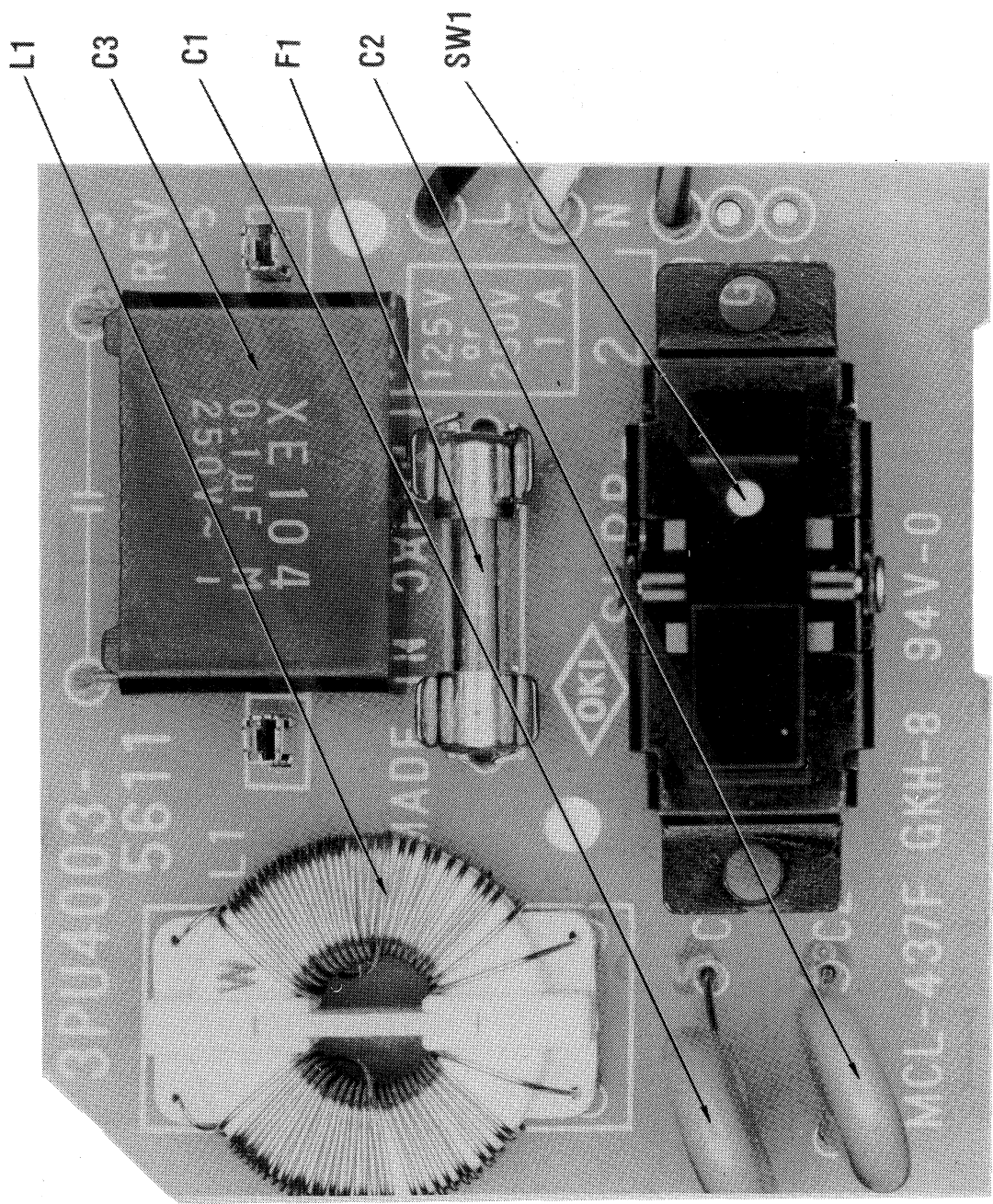
PIN NO.	IC Q13	PIN NO.	IC Q13	PIN NO.	IC Q13
1	P	9	P	17	P
2	P	10	P	18	P
3	P	11	P	19	P
4	P	12	L	20	P
5	P	13	P	21	P
6	P	14	P	22	P
7	P	15	P	23	P
8	P	16	P	24	H

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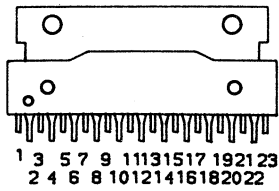
OKIDATA
MODEL MICROLINE 192 PLUS



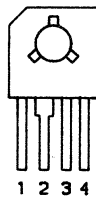
SAFETY PRECAUTIONS

1. Use an isolation transformer for servicing.
2. Maintain AC line voltage at rated input.
3. Remove AC power from the Printer before servicing or installing electrostatically sensitive devices. Examples of typical ES devices are integrated circuits and semiconductor "chip" components.
4. Use extreme caution when handling the printed circuit boards. Some semiconductor devices can be damaged easily by static electricity. Drain off any electrostatic charge on your body by touching a known earth ground. Wear a commercially available discharging wrist strap device. This should be removed prior to applying power to the unit under test.
5. Use a grounded-tip, low voltage soldering iron.
6. Use an isolation (times 10) probe on scope.
7. Do not remove or install board, mechanical or electrical parts or other peripherals with Printer AC power On.
8. Do not use freon-propelled sprays. These can generate electrical charges sufficient to damage semiconductor devices.
9. This Printer is equipped with a grounded three-pronged AC plug. This plug must fit into a grounded AC power outlet. Do not defeat the AC plug safety feature.
10. Periodically examine the AC power cord for damaged or cracked insulation.
11. The Printer cabinet is equipped with vents to prevent heat build-up. Never block, cover or obstruct these vents.
12. Instructions should be given, especially to children, that objects should not be dropped or pushed into the vents of the cabinet. This could cause shock or equipment damage.
13. Never expose the Printer to water. If exposed to water, turn the unit Off. Do not place the Printer near possible water sources.
14. Never leave the Printer unattended or plugged into the AC outlet for long periods of time. Remove AC plug from AC outlet during lightning storms.
15. Do not allow anything to rest on AC power cord.
16. Unplug AC power cord from outlet before cleaning Printer.
17. Never use liquids or aerosols directly on the Printer. Spray on cloth and then apply to the Printer cabinet. Make sure the Printer is disconnected from the AC power line.

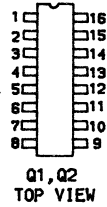
IC PINOUTS & TERMINAL GUIDES



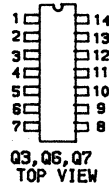
IC1
FRONT VIEW



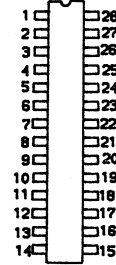
IC2
FRONT VIEW



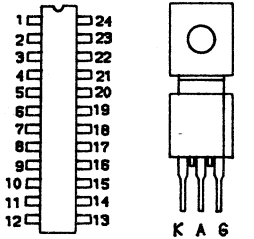
Q1, Q2
TOP VIEW



Q3, Q6, Q7
TOP VIEW



Q4
TOP VIEW

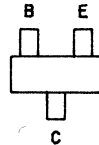


Q13
TOP VIEW

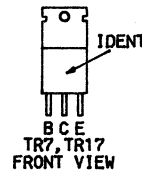
SCR
FRONT VIEW



TR1, TR3
FRONT VIEW

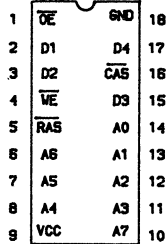


TR5, TR9, TR11, TR102
TR103, TR104, TR108, TR109
TOP VIEW



TR7, TR17
FRONT VIEW

TMS4416-15NL



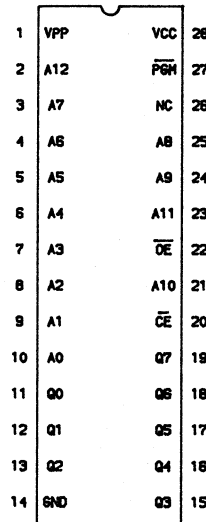
Q10, Q11
RAM
TOP VIEW

HN272566-25



Q9
ROM
TOP VIEW

HN48271286-25



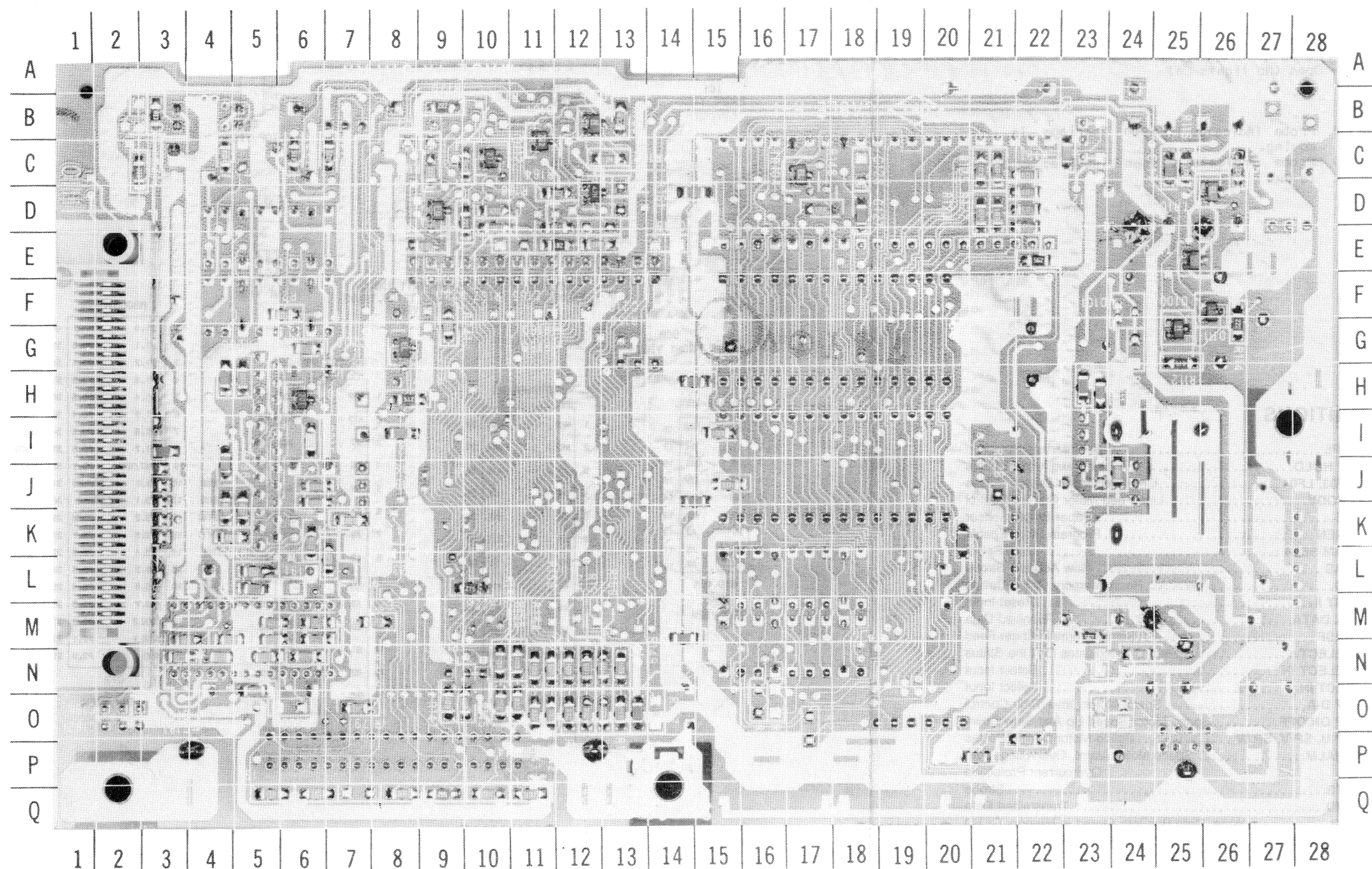
Q8
EPROM
TOP VIEW

MB0C51F-49

1	P1.0	VCC	40
2	P1.1	P0.0	39 (AD0)
3	P1.2	P0.1	38 (AD1)
4	P1.3	P0.2	37 (AD2)
5	P1.4	P0.3	36 (AD3)
6	P1.5	P0.4	35 (AD4)
7	P1.6	P0.5	34 (AD5)
8	P1.7	P0.6	33 (AD6)
9	RST/VPD	P0.7	32 (AD7)
10	P3.0	EA/VDD	31
11	P3.1	ALE/PROG	30
12	P3.2	PSEN	29
13	P3.3	P2.7	28 (A15)
14	P3.4	P2.6	27 (A14)
15	P3.5	P2.5	26 (A13)
16	P3.6	P2.4	25 (A12)
17	P3.7	P2.3	24 (A11)
18	XTAL2	P2.2	23 (A10)
19	XTAL1	P2.1	22 (A9)
20	GND	P2.0	21 (A8)

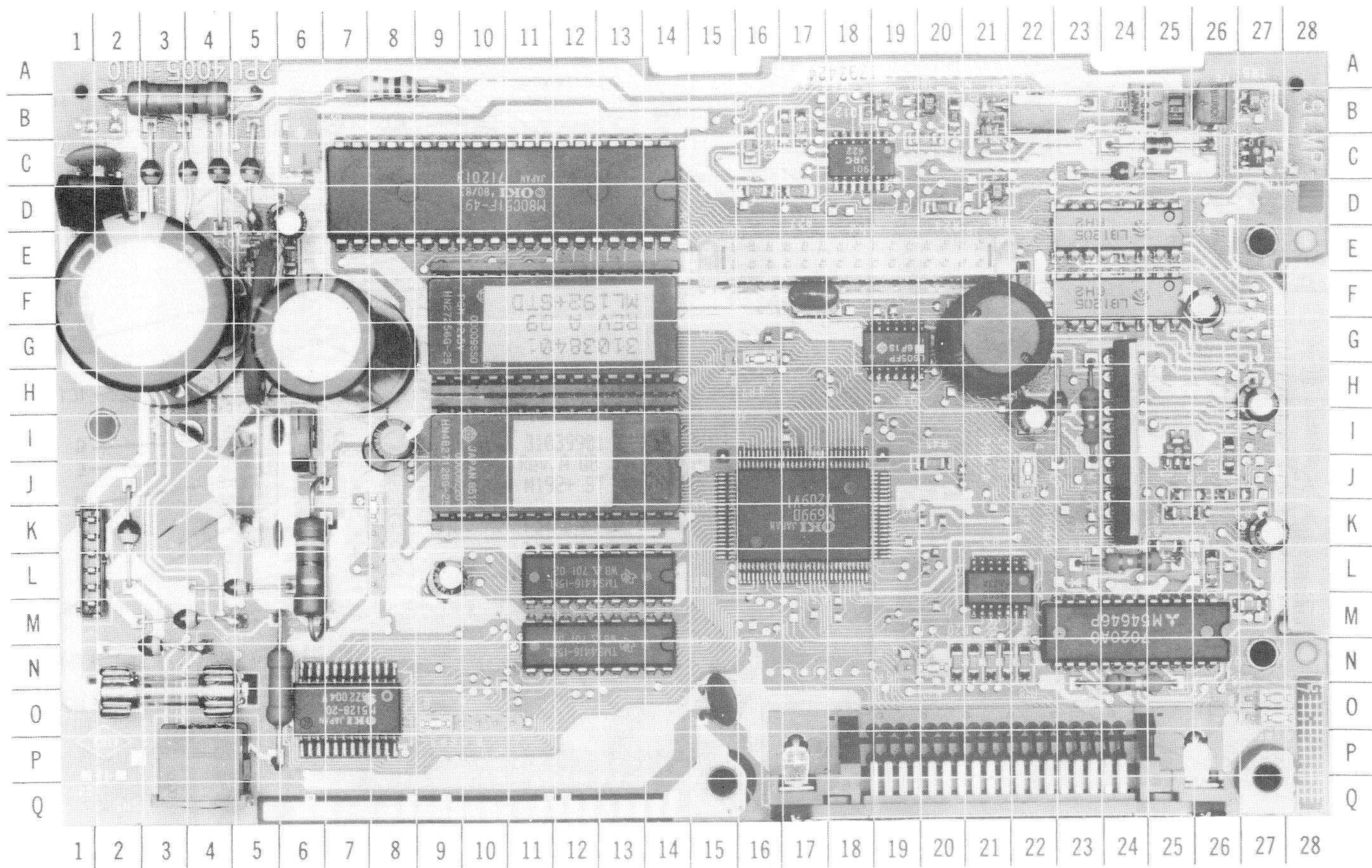
Q12
CPU
TOP VIEW

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MODEL MICROLINE 192 PLUS



GridTrace LOCATION GUIDE

C107	P-21	R164	D-12
C110	G-23	R166	E-9
C111	G-23	R167	D-10
C117	C-25	R168	D-10
C127	D-18	R169	C-9
C129	D-14	R170	B-9
C133	M-14	R172	Q-11
C134	J-14	R173	Q-10
C136	H-15	R174	Q-8
C181	N-5	R175	C-10
C182	N-4	R177	Q-6
C186	M-5	R178	Q-5
C188	M-4	R179	Q-7
C204	J-3	R180	N-6
C205	I-3	R183	N-3
C207	H-4	R184	M-6
C208	G-6	R185	M-6
C215	I-6	R187	M-5
C218	L-3	R189	M-3
C225	Q-13	R190	L-7
C229	L-5	R191	L-5
C230	J-4	R192	K-6
C231	M-8	R193	K-4
C234	K-20	R194	K-7
C237	I-8	R195	J-6
C238	C-23	R196	J-6
D100	G-25	R197	Q-5
D105	D-12	R198	K-5
D106	B-12	R199	K-4
D107	C-11	R200	K-3
D110	H-6	R201	K-3
D111	F-26	R202	J-3
D112	C-10	R203	J-3
R103	N-24	R206	H-5
R105	M-23	R209	F-6
R106	P-22	R210	C-7
R109	J-24	R211	C-6
R112	G-25	R212	C-4
R114	G-26	R213	C-2
R115	C-26	R214	B-3
R116	C-25	R220	E-22
R118	E-22	R223	Q-9
R119	D-22	R227	H-8
R120	D-22	R228	L-10
R121	C-22	R232	J-15
R122	D-21	R240	D-10
R123	D-21	R241	G-9
R124	C-21	TR102	E-25
R125	C-21	TR103	D-26
R135	I-15	TR104	C-17
R138	Q-13	TR108	D-9
R139	Q-13	TR109	G-8
R140	Q-12		
R141	Q-12		
R142	Q-11		
R143	Q-11		
R144	Q-11		
R145	Q-10		
R146	Q-10		
R147	Q-9		
R148	D-17		
R149	N-13		
R150	N-13		
R151	N-12		
R152	N-12		
R153	N-11		
R154	N-11		
R155	N-11		
R156	N-10		
R158	E-12		
R159	E-12		
R160	D-12		
R162	C-13		
R163	B-13		



MAIN BOARD

A Howard W. Sams **GRIDTRACE™** Photo

GridTrace LOCATION GUIDE

BAT	F-5	R33	L-6
C1	M-27	R34	N-5
C6	K-27	R38	E-6
C11	H-27	R40	A-8
C13	O-15	R44	B-3
C14	I-22	R45	J-20
C15	F-26	R47	N-22
C23	F-17	SCR	P-1
C32	L-9	SP1	L-8
C35	I-8	SP2	K-8
C36	G-6	SP3	O-9
C39	D-6	SP4	N-20
C42	F-2	SP5	O-27
C43	C-1	SP6	O-27
CN1	P-20	SP7	G-16
CN2	E-19	SP8	J-22
CN3	I-28	SP9	O-10
CN4	L-1	TR1	I-25
CN5	P-4	TR3	C-27
D2	H-23	TR5	B-27
D4	C-25	TR7	B-22
D6	C-24	TR9	D-21
D8	B-22	TR11	B-20
D10	B-21	TR17	J-5
D12	B-19		
D13	M-3		
D14	M-4		
D15	L-5		
D16	K-2		
D18	E-5		
D19	C-5		
D20	C-4		
D21	C-4		
D22	C-3		
F1	O-3		
IC1	I-24		
IC2	I-6		
L1	G-21		
OSC	B-6		
PE	B-25		
Q1	F-24		
Q2	D-24		
Q3	L-21		
Q4	M-24		
Q5	K-17		
Q6	G-19		
Q7	C-18		
Q8	I-12		
Q9	F-12		
Q10	M-12		
Q11	L-12		
Q12	C-12		
Q13	O-7		
R2	O-24		
R3	L-24		
R4	L-26		
R5	K-25		
R7	K-25		
R8	J-26		
R9	J-25		
R10	J-26		
R12	I-23		
R16	F-22		
R18	N-21		
R19	N-21		
R20	N-21		
R21	N-20		
R24	D-20		
R25	B-20		
R26	C-20		
R27	D-17		
R28	D-16		
R29	B-17		
R31	C-16		

**OKIDATA
MODEL MICROLINE 192 PLUS**

MAIN BOARD



CP40-A OKIDATA
MODEL MICROLINE 192 PLUS**ALTERNATE SCHEMATICS****CP40-A** OKIDATA
MODEL MICROLINE 192 PLUS**SAMS™****Howard W. Sams & Co.**

4300 West 62nd Street, P.O. Box 7092, Indianapolis, Indiana 46206 U.S.A.

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co. as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co. by the manufacturers of the particular type of replacement part listed.

88CP19035**DATE 6 88**

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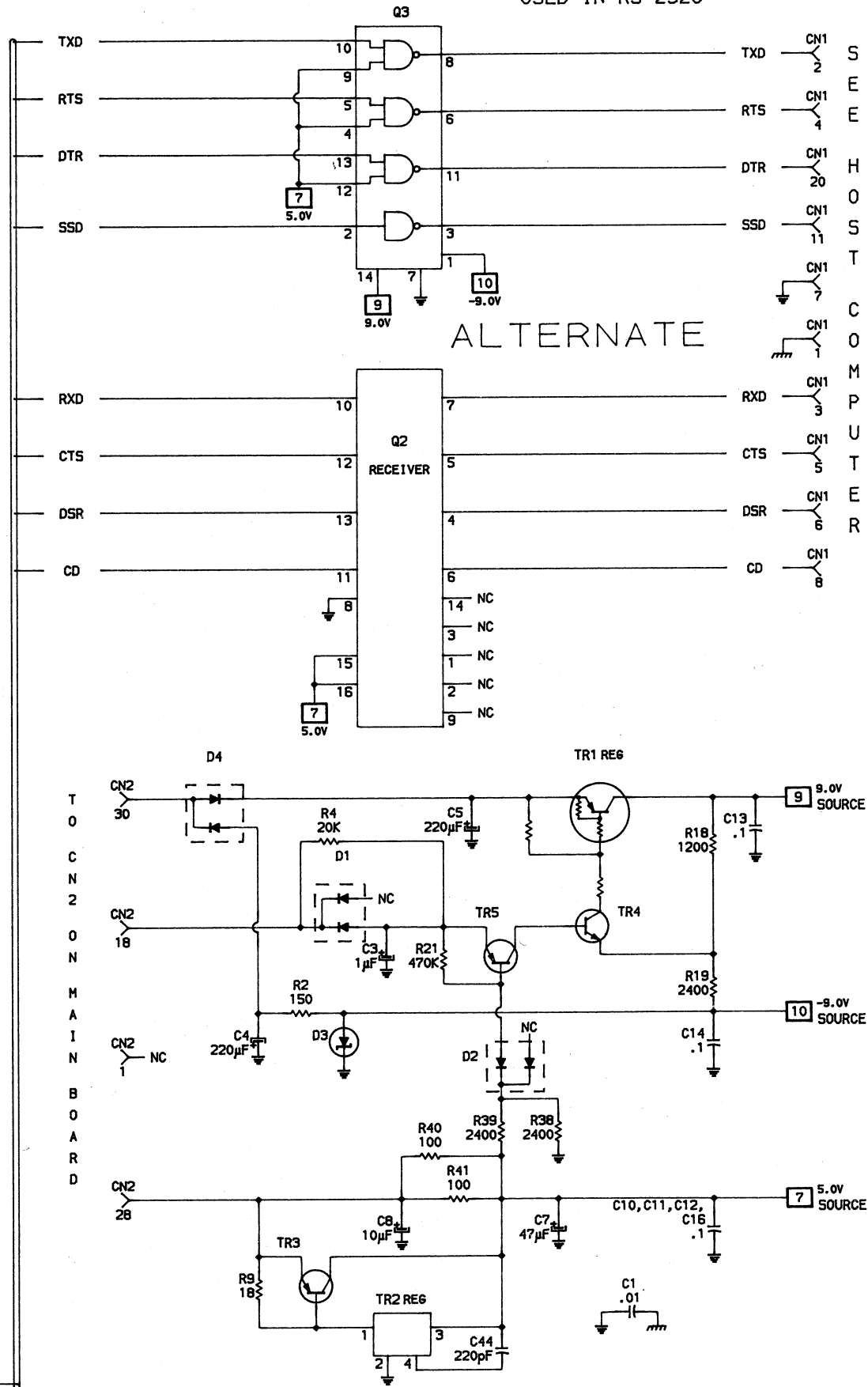
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Printed in U.S. of America



USED IN RS-232C

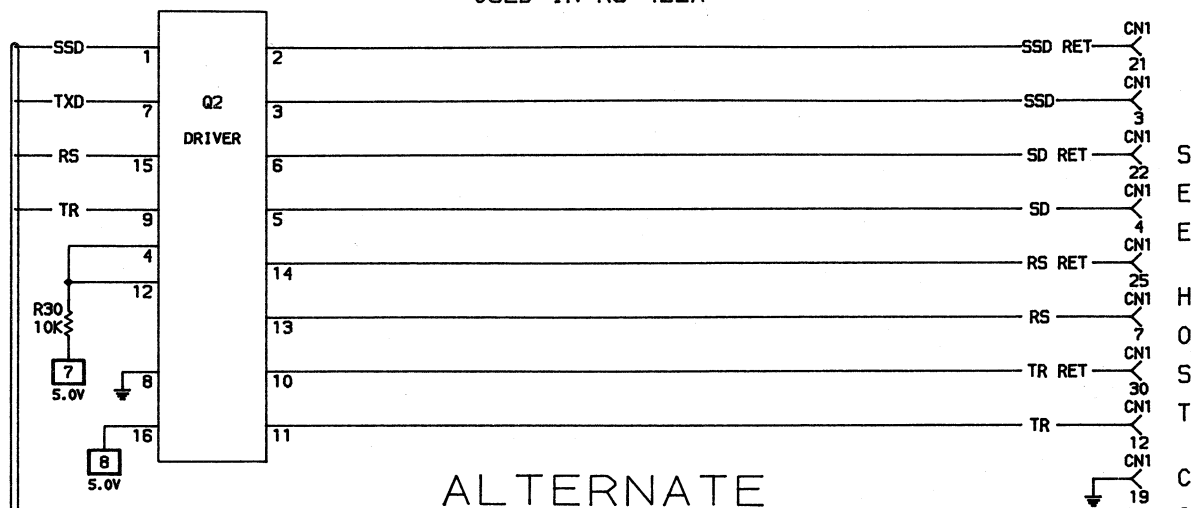


A PHOTOFACT STANDARD NOTATION SCHEMATIC

WITH **CIRCUITRACE**

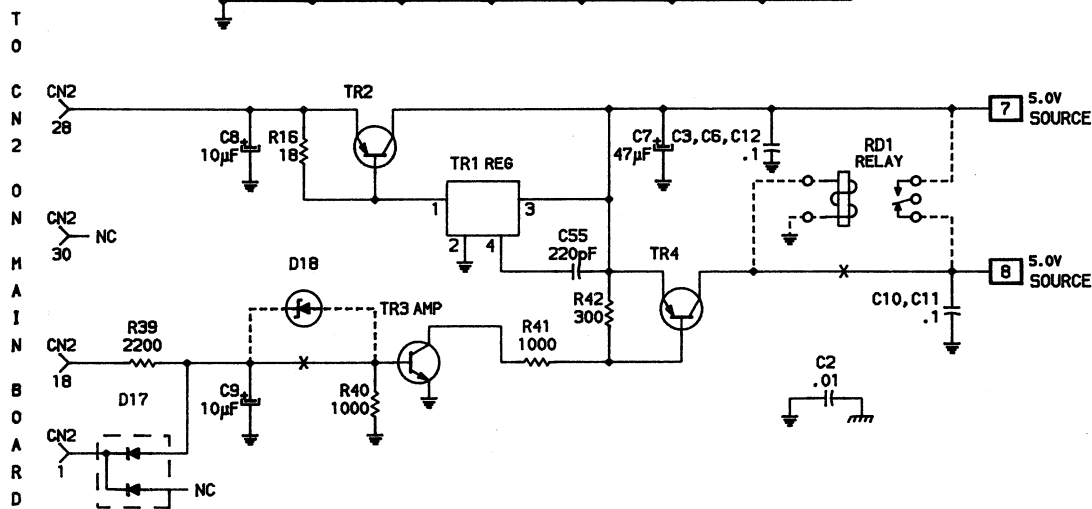
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USED IN RS-422A



SEE HOST COMPUTER

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MODEL MICROLINE 192 PLUS

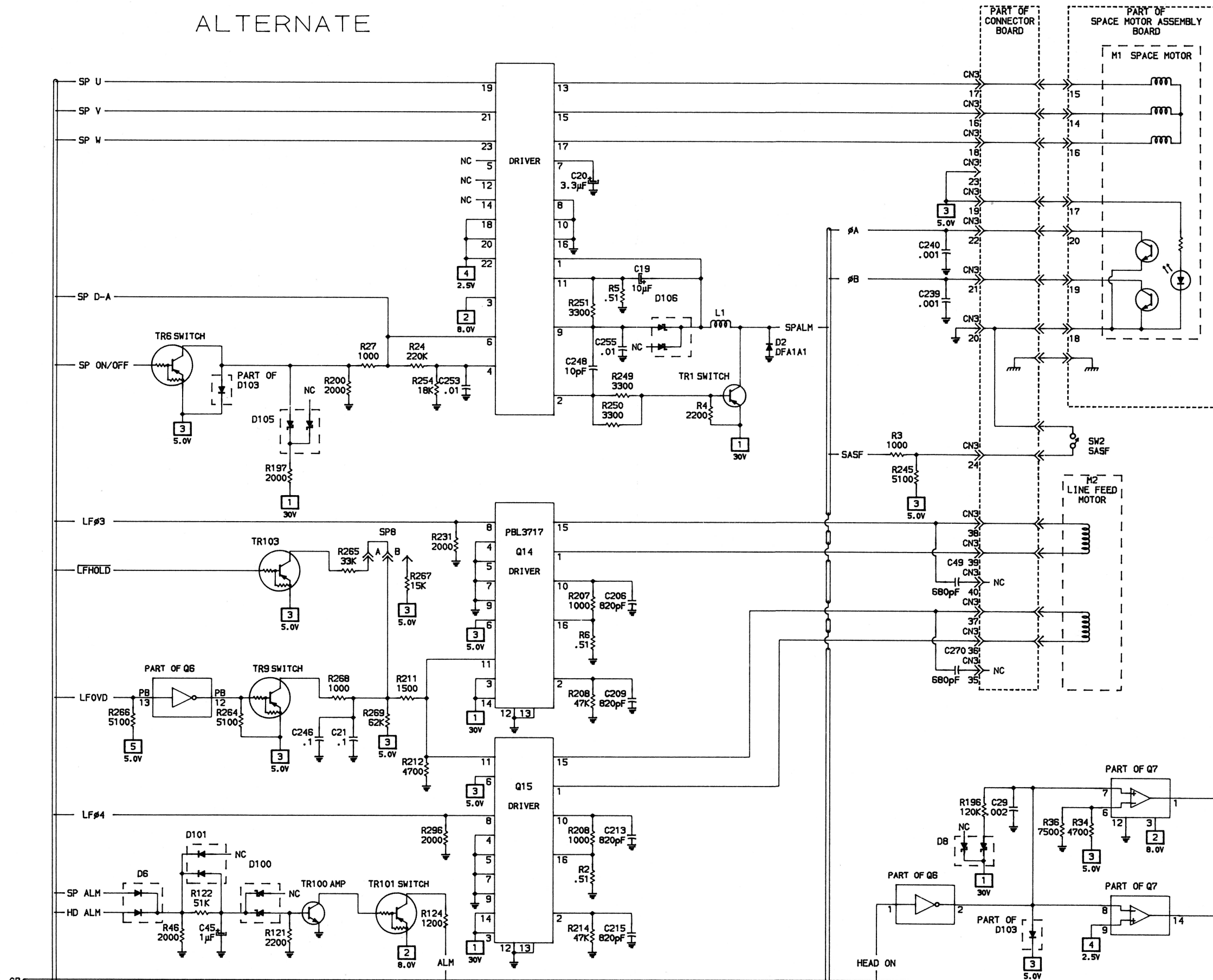


ALTERNATE

A PHOTOFAC STANDARD NOTATION SCHEMATIC
WITH CIRCUITRACE

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7

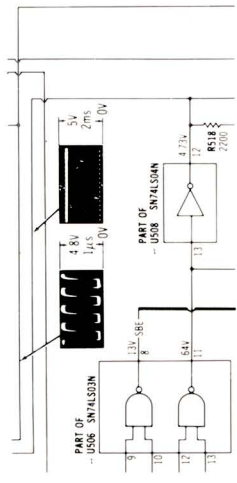


HOWARD W. SAMS & COMPANY

COMPUTERFACTS™ put easy to use, informative technical data right at your fingertips. Each edition includes specific service information on the individual component, along with some overall troubleshooting hints.

The following information is just a sample of the many valuable time saving features contained in this exclusive Sams COMPUTERFACTS publication:

- Preliminary Service Checks section is an easy to use, step by step guide for the experienced technician or hobbyist, and even beginners.
- SAMS famous industry accepted standardized notation schematics containing CIRCUITRACE® , GRIDTRACE™, waveforms, voltages and stage identification.

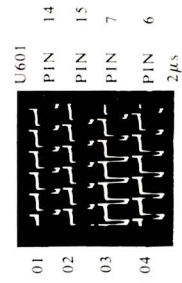


• Step by Step Troubleshooting guides the technician through the necessary procedures to quickly locate the problem.

TROUBLESHOOTING

MICROPROCESSOR CHIP (CPU) OPERATION

Verify the processor is functioning by checking the signals on the address lines (pins 10 thru 24 of IC U600) and the data lines (pins 41 thru 56) using a logic probe or a scope. If a logic probe is used, refer to the "Logic Chart" for the correct readings. If a scope is used, the waveforms on the address lines (except pins 22 and 23 which have no signal in Power Up mode) should be similar to Figure 1. The waveforms on the data lines should be similar to Figure 2.



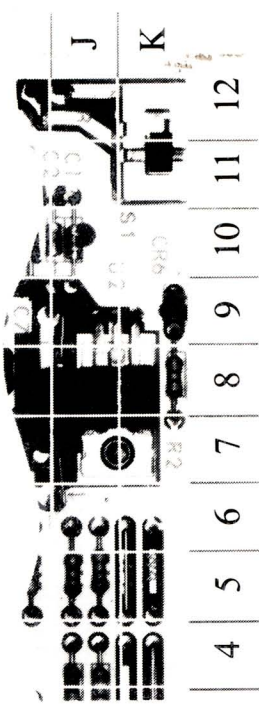
• Logic Chart containing logic probe readings to isolate defective circuitry and components.

LOGIC

PIN NO	IC U100	PIN NO	IC U100	PIN NO	IC U100	IC U101	IC U102	IC U103	IC U104	IC U105	IC U106	IC U107	IC U108	IC U109
1	P	21	P	1	P	L	L	L	L	L	L	L	L	L
2	P	22	P	2	P	L	L	L	L	L	L	L	L	L
3	P	23	P	3	P	H	H	H	H	H	H	H	H	H

Remove staples and use cover for file folder.

- Quick Component Location using the SAMS exclusive GRIDTRACE, CIRCUITRACE, and component photographs.



- Complete Components Parts List in an easy to use format with field replacements shown when possible. SAMS unique semiconductor, chip and IC cross-reference gives you many replacements to choose from and is available at your Electronic Distributor.

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	TYPE No.	MFG. Part No.	ECG Part No.	NTE Part No.	RCA Part No.	ZENITH Part No.	NOTES
D102	1SS53	1149-2576	ECG519	NTE519	SK9091/177	103-131	
D103	2N60FM	1149-2527	ECG109	NTE109	SK3088	103-Z9001	
D201	1N4004GP	1201-4205	ECG116	NTE116	SK3312	212-76-02	
D501 thru D503	1SS53	1149-2576	ECG519	NTE519	SK9091/177	103-131	

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ISBN: 0-672-09028-7

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